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Tips & Tricks

File Transfers Tips

When transferring files to NAS systems, there may be some ways to improve your performance without modifying your system (see TPC Performance Tuning for WAN Transfers). Below are some quick and easy techniques to try that may improve your performance rates when transferring files remotely to or from NAS.

- Transfer files from the /nobackup file system, which is often faster than the locally mounted disks.
- If you are using SCP, try adding the "-C" option to enable compression:

  ```
  $ scp -C filename user@remotehost.com:
  ```

  This can sometimes double your performance rates.
- For SCP transfers, use a low process-overhead cipher like *arcfour*:

  ```
  $ scp -carcfour  filename user@remotehost.com:
  ```

  This can increase your rates by 5x, compared to older methods like *3des*.
- If you are transferring from Lou, make sure your file is online first. Use the following DFM commands to determine this:

  ```
  $ dmls -al filename   # show the status of your file.
  $ dmget filename      # retrieve your file from tape prior to transferring.
  ```

  Get the full list of DMF commands.
- Use the bridge nodes to transfer files instead using of the Pleiades and Columbia front ends. These hosts have 10-Gigabit interfaces and more memory to handle both multiple and large file transfers.
- If you are transferring many small files, try using the *tar* command to compress them into a single file prior to transfer. Copying one large file is faster than transferring many small files.
- For files larger than a gigabyte, we recommended using BBFTP software, which can achieve much faster rates than single-stream applications such as SCP or RSYNC.

If you continue experiencing slow transfers and want to work with a network engineer to help improve file transfers, please contact support@nas.nasa.gov.

Avoiding Job Failure from Overfilling /PBS/spool

Before a PBS job is completed, its error and output files are kept in the /PBS/spool directory of the first node of your PBS job. The space under /PBS/spool is limited, however, and when it fills up, any job that tries to write to /PBS/spool may die. To prevent this, you should *not* write large amount of contents in the PBS output/error files.

If your executable normally produces a lot of output to the screen, you should redirect its output in your PBS script. For example:

```
#PBS ...
mpiexec a.out > output
```

To see the contents of your PBS output/error files before your job completes, follow the two steps below:

1. Find out the first node of your PBS job using "-W o=+rank0" for qstat:

   ```
   %qstat -u your_username -W o=+rank0
   JobID          User    Queue   Jobname    TSK Nds     wallt S     wallt  Eff Rank0
   -------------- ------- ------- --------- ---- --- --------- - --------- ---- ----------
   868819.pbspl1 zsmith long    ABC        512   64 5d+00:00 R 3d+08:39 100% r162i0n14
   ```

   This shows that the first node is r162i0n14.

2. Log in to the first node and *cd* to /PBS/spool to find your PBS stderr/out file(s). You can view the content of these files using *vi* or *view*.

```
%ssh r162i0n14
%cd /PBS/spool
%ls -lrt
-rw------- 1 zsmith a0800 49224236 Aug  2 19:33 868819.pbspl1.nas.nasa.gov.OU
-rw------- 1 zsmith a0800  1234236 Aug  2 19:33 868819.pbspl1.nas.nasa.gov.ER
```

Increasing File Transfer Rates

One challenge users face is moving large amounts of data efficiently to/from NAS across the network. Often, minor system, software, or network configuration changes can increase network performance an order of magnitude or more. This article describes some methods for increasing data transfer performance.

If you are experiencing slow transfer rates, try these quick tips:

- Transfer using the bridge nodes (bridge1, bridge2) instead of the Pleiades front-end systems (PFEs). The bridge nodes have much more memory, along with 10-Gigabit Ethernet interfaces to accommodate many large transfers. The PFEs often become oversubscribed and cause slowness.
- If using the scp command, make sure you are using OpenSSH version 5 or later. Older versions of SSH have a hard limit on transfer rates and are not designed for WAN transfers. You can check your version of SSH by running the command ssh -V.
- For large files that are a gigabyte or larger, we recommend using BBFTP. This application allows for transferring simultaneous streams of data and doesn't have the overhead of encrypting all the data (authentication is still encrypted).

Online Network Testing Tools

The NAS PerfSONAR Service provides a custom website that that allows you to quickly self-diagnose your remote network connection issues, and reports the maximum bandwidth between sites, as well as any problems in the network path. Command-line tools are available if your system does not have a web browser.

Test results are also sent to our network experts, who will analyze traffic flows, identify problems, and work to resolve any bottlenecks that limit your network performance, whether the problem is at NAS or a remote site.

One-on-One Help

If you still require assistance in increasing your file transfer rates, please contact the NAS Control Room at support@nas.nasa.gov, and a network expert will work with you or your local administrator one-on-one to identify methods for increasing your rates.

To learn about other network-related support areas. see also, End-to-End Networking Services.